No. 7200070

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Arkansas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF seventeen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

ALFALFA

'Victoria'

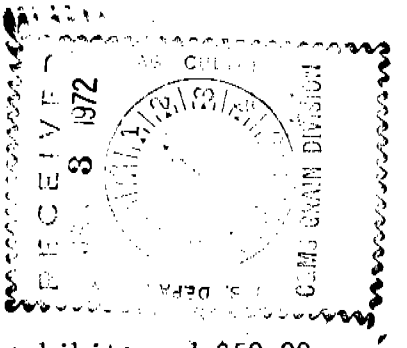
In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington this tenth day of August in the year of our Lord one thousand nine hundred and seventy-eight

Attest:

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Secretary of Agriculture

FORM GR-470 (REVERSE)



INSTRUCTIONS

GENERAL: Send an original copy of the application, exhibits and $50.00 fee to U.S. Dept. of Agriculture, Consumer and Marketing Service, Grain Division, Hyattsville, Maryland 20782. Retain one copy for your files. All items on the face of the form are self-explanatory unles noted below.

ITEM

5 Insert the date the applicant determined that he had a new variety.

12a First, give the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method. Second, give the details of subsequent stages of selection and multiplication. Third, indicate the type and frequency of variants during reproduction and multiplication and state how these variants may be identified. Fourth, provide evidence on stability.

12b First, give any special characteristics of the seed and of the plant as it passes through the seedling stage, flowering stage and the fruiting stage. Second, describe the mature plant and compare it with a similar commercial variety grown under the same conditions, and indicate the differences.

12c A supplemental form will be furnished by the PVPO to describe in detail a variety for each kind of seed.

12d Provide complete data indicative of novelty. Seed and plant specimens may be submitted and seeds submitted may be sterile. Where possible, include photographs of plant comparisons, chemical tests, etc.

12e Indicate whether applicant is the actual breeder, the employer of the breeder, the owner through purchase or inheritance. etc.

FORM GR-470 (2-12-71)

UNITED STATES DEPARTMENT OF AGRICULTURE
CONSUMER AND MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

FORM APPROVED
OMB NO. 40-R3712

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION	2. KIND NAME	FOR OFFICIAL USE ONLY
Victoria	Alfalfa	PVPO NUMBER 72070
3. GENUS AND SPECIES NAME	4. FAMILY NAME *(Botanical)*	FILING DATE 11/3/72 / TIME 1115 ~~A.M.~~ P.M.
Medicago sativa L.	Leguminosae	
	5. DATE OF DETERMINATION September 5, 1968	FEE RECEIVED $ 750.00 / CHARGES —

6. NAME OF APPLICANT(S)	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*	8. TELEPHONE AREA CODE AND NUMBER
Arkansas Agricultural Experiment Station	University of Arkansas Fayetteville, Arkansas 72701	501-575-2253

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	10. STATE OF INCORPORATION	11. DATE OF INCORPORATION
Public Research Institution		

12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all papers:

Dr. ~~E. M. Cralley, Director~~ L. O. Warren
Arkansas Agricultural Experiment Station
University of Arkansas
Fayetteville, Arkansas 72701

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- [X] 12A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52, P.L. 91-577)*
- [X] 12B. Exhibit B, Botanical Description of the Variety
- [X] 12C. Exhibit C, Objective Description of the Variety
- [X] 12D. Exhibit D, Data Indicative of Novelty
- [X] 12E. Exhibit E, Statement of the Basis of Applicant's Ownership

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable. *(See Section 52, P.L. 91-577).*

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed? *(See Section 83(a), P.L. 91-577) (If "Yes," answer 14B and 14C below.)* [X] YES [ ] NO

14B. Does the applicant(s) specify that this variety be limited as to number of generations?	14C. If "Yes," to 14B, how many generations of production beyond breeder seed?
[X] YES [ ] NO	Two, foundation and certified

Applicant is informed that false representation herein can jeopardize protection and result in penalties.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes that the variety is distinct, uniform, and stable as required in Section 41 and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act (P.L. 91-577).

DEC 29 1971
(DATE)

E. M. Cralley
(SIGNATURE OF APPLICANT)

1

(DATE)

(SIGNATURE OF APPLICANT)

Letter of July 2, 1975

EXHIBIT A

Origin and Breeding History of Variety

"Victoria" is a synthetic made by recombining nine parental clones. Source nurseries of about 500 creeping-rooted or rhizomatous plants were established in the fall of 1954 at Marie and Osceola, Arkansas. Fifty clones were selected and established in a polycross nursery in 1957 at Fayetteville, Arkansas. Tests of their polycross and S_1 progenies were conducted at Fayetteville and Keiser, Arkansas, from 1958 to 1960. The nine parental clones (two from Can. Ma 5110, two from Can. Sc 3513, one from Can. Sc Ma 531, one from Neb. A-224 Syn. 3, two from "Rhizoma," and one of unknown origin) were selected on the basis of their polycross and S_1 progeny performance during the 3-year evaluation period. Final testing was done under the experimental designation Arkansas Synthetic P-3. All plots used in the final testing were established from synthetic-2 seed.

Breeder seed is a composite of equal amounts of seed from each of the nine parental clones grown in an isolated space-planted polycross nursery at Fayetteville, Arkansas.

Based on tests at Fayetteville and Keiser, Arkansas, 30 to 50 percent of the plants have the inherent capacity to spread by means of creeping roots or rhizomes in spaced plantings. The creeping habit is seldom expressed in dense stands of alfalfa, however, and it is not until there is a noticeable decrease in stand density that the creeping tendency normally becomes apparent. In thin stands or in space-planted nurseries plants vary in habit of growth from decumbent to semi-erect. This variation in growth habit among plants is not as apparent in thick stands.

Synthetic-2 seed (seed produced from plots planted with breeder seed) grown in Oklahoma and Arkansas has been used to establish plots to evaluate the performance and stability of this variety over a period of several years at different locations. No more variation in the stability of plant characteristics and performance of this variety has been recorded than for the three check varieties ("Buffalo," "Cody," and "Vernal") with which it has been compared. (See Tables 10 and 11 in attached material.)

EXHIBIT B

Botanical Description of the Variety

There are no known special characteristics of the seed or of the plant as it passes through the seedling stage. Flower color of "Victoria" is quite variable (variegated type) and ranges from white through various shades of yellow, green, and purple.

"Victoria" has a semi-decumbent growth habit and wide, low crowns. It has a much-branched taproot with an inherent capacity to spread by means of creeping roots or rhizomes and a large number of relatively small stems per crown. In dense stands the creeping habit is seldom expressed and the plants tend to grow more erect.

When grown in Arkansas and compared with "Vernal," plants of "Victoria" have wider crowns, more stems per crown, and a more branched taproot system on the average (See photograph on attached reprint). In thin stands or in stands with or without a companion grass that are being grazed, plants of "Victoria" are more decumbent than those of "Vernal." "Victoria" has averaged higher in percent leaves than "Vernal" when cut in the early bloom stage of growth.

Revised Exhibit D for the Victoria variety

Data Indicative of Novelty

The alfalfa variety 'Vernal' to the variety most similar to 'Victoria'. The differences between Victoria and Vernal (and other varieties where appropriate) for those characteristics which have been evaluated are given below:

(1). Percent leaves in the hay[1]

Fayetteville, Arkansas - Test #11 - 1965-1967 Ave.

Vernal	51.7
Victoria	56.2
Buffalo	53.7
Cody	51.4

Fayetteville, Arkansas - Test #12 - 1967-1974 Ave.

Vernal	48.2
Victoria	51.9
Buffalo	49.4
Cody	46.8

Kieser, Arkansas - Test #13 - 1967

Vernal	44.3
Victoria	48.5
Buffalo	46.1

Fayetteville, Arkansas - Test #17 - 1973-1974 Ave.

Vernal	49.6
Victoria	51.8
Dawson	45.7
Kanza	46.6

(2). Percent crude protein in the hay[2]

Fayetteville, Arkansas - Test #11 - 1965-1967 Ave.

Vernal	18.96
Victoria	19.09
Buffalo	18.65
Cody	19.02

Fayetteville, Arkansas - Test #12 - 1967

Vernal	18.92
Victoria	18.41
Buffalo	16.32
Cody	16.85

Keiser, Arkansas - Test #13 - 1967

Vernal	17.14
Victoria	17.94
Buffalo	16.47

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[1]Percent leaves in the hay data presented above were from the second cutting only each year.

[2]Percent crude protein in the hay data presented above were from the second cutting only each year.

(3). Percent of plants spreading by means of creeping roots or rhizomes at the end of one and two years after established[1]

Fayetteville, Arkansas - Spaced-planted stands established with	Synthetic-2 seed	Synthetic-3 seed
First year after establishment		
Vernal	0	0
Victoria	41	29
Rambler	-[2]	1
Rhizoma	-[2]	3
Second year after establishment		
Vernal	0	0
Victoria	53	35
Rambler	-[2]	5
Rhizoma	-[2]	4

(4). Width of crowns and branching of taproots[3]

Measurement of plants dug from a good stand of plants three and one-half years old showed that the crown width of Victoria was two times as wide as that of Vernal and one and one-half times as wide as that of Rhizoma. The number of taproot branches measuring one-fourth inch or more in diameter was slightly less than one per plant for Vernal and 3.4 per plant for Victoria (see photo on attached reprint).

(5). Resistance to spotted alfalfa aphid[4]

Five Points, California - 1963	
Vernal	6.3
Victoria	1.7
Ranger	2.0
Cherokee	4.3

Fayetteville, Arkansas - 1968	
Vernal	7.0
Victoria	2.0
Buffalo	7.5
Cody	2.0

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[1]Data obtained from space-planted stands (spaced 3 feet apart within and between rows) at Fayetteville, Arkansas. Rambler and Rhizoma are the only other varieties tested to date that exhibit the creeping tendency under Arkansas conditions.

[2]Synthetic-2 seed of Rambler and Rhizoma was not available for inclusion in this part of the comparison.

[3]Crowns and taproots of 100 plants each of Vernal, Victoria, and Rhizoma were measured.

[4]Spotted alfalfa aphid injury scores were based on a scale of 1 to 9; 1 = no injury, 9 = severe injury.

(6). Resistance to thrips[1]

Five Points, California - 1963	
Vernal	7.7
Victoria	4.5
Ranger	7.2
Cherokee	5.3

(7). Injury caused by leafhoppers[2]

Fayetteville, Arkansas - Test #11 - 1965	
Vernal	4.0
Victoria	4.0
Buffalo	5.0
Cody	4.9

Fayetteville, Arkansas - Test #12 - 1968	
Vernal	4.4
Victoria	4.0
Buffalo	5.0
Cody	4.8

Fayetteville, Arkansas - Test #12 - 1969	
Vernal	4.1
Victoria	3.9
Buffalo	5.4
Cody	5.9

Fayetteville, Arkansas - Test #12 - 1971	
Vernal	4.1
Victoria	4.3
Buffalo	4.6
Cody	4.6

(8). Resistance to Summer Black Stem[3]

Fayetteville, Arkansas - Test #11 - 1966	
Vernal	5.8
Victoria	4.5
Buffalo	5.0
Cody	4.0

Fayetteville, Arkansas - Test #12 - 1967	
Vernal	4.0
Victoria	4.0
Buffalo	4.9
Cody	5.3

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[1]Thrips injury scores were based on a scale of 1 to 9; 1 = no injury, 9 = severe injury

[2]Leafhopper injury scores based on a scale of 1 to 9; 1 = no injury; 9 = severe injury

[3]Summer black stem scores based on a scale of 1 to 9; 1 = no infection, 9 = severe infection

(9). Resistance to Downy Mildew[1]

Five Points, California - 1963	
Vernal	5.3
Victoria	3.8
Ranger	6.0
Cherokee	3.3

(10). Resistance to Phytophthora Root Rot[2]

St. Paul, Minnesota - 1970	
Vernal	11.9
Victoria	27.4
Dawson	7.3
Kanza	12.5

Ames, Iowa - 1974	
Rambler[3]	11.5
Victoria	28.6
Agate	54.5
Saranac	8.7

(11). Resistance to Anthracnose

Growth Chamber test - Beltsville, Maryland - 1974[4]

	Percentage of plants in score classes				
	1	2	3	4	5
Vernal	4.1	4.1	8.9	72.4	10.6
Victoria	4.0	0.0	7.0	78.0	11.0
Dawson	4.2	2.8	2.8	85.9	4.2
Arc	83.0	2.1	2.1	10.4	0.0

Field test #17 - Fayetteville, Arkansas - 1976[5]	
Vernal	3.5
Victoria	2.5
Dawson	2.6
Kanza	1.9

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[1]Downy mildew scores based on a scale of 1 to 9; 1 = no infection, 9 = sever infection

[2]Percent of resistant plants in test

[3]Vernal was not included in this test

[4]Score classes: 1 - absence of lesions, 2 - long, narrow lesions, 3 - lesions wide, but do not girdle the stem, 4 - long, coalescing lesions that girdle and kill the stem, and 5 - lethal to the entire seedling

[5]Anthracnose scores based on a scale of 1 to 9; 1 = no infection, 9 = severe infection

(12). Seed Yield[1]

Five Points, California - 1963	
Vernal	580
Victoria	503
Ranger	606
Cherokee	688

(13). Recovery After Cutting[2]

Fayetteville, Arkansas - Test #11 - 1965	
Vernal	5.9
Victoria	6.6
Buffalo	5.0
Cody	5.3

Fayetteville, Arkansas - Test #11 - 1966	
Vernal	6.3
Victoria	6.8
Buffalo	5.0
Cody	5.0

Fayetteville, Arkansas - Test #11 - 1967	
Vernal	5.4
Victoria	5.8
Buffalo	5.0
Cody	5.0

Fayetteville, Arkansas - Test #12 - 1974	
Vernal	5.5
Victoria	5.5
Buffalo	4.8
Cody	4.9

Fayetteville, Arkansas - Test #17 - 1974	
Vernal	5.5
Victoria	5.5
Dawson	4.8
Kanza	5.0

Clarkedale, Arkansas - Test #18 - 1974	
Vernal	5.0
Victoria	5.5
Agate	6.7
Saranac	5.7

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[1]Seed yield in pounds of clean seed per acre

[2]Rate of recovery after cutting scores based on a scale of 1 to 9; 1 = rapid recovery, 9 = slow recovery

EXHIBIT D

Data Indicative of Novelty

"Victoria" produces a high percent of leaves and a high percent of crude protein in the hay. It has a tendency to spread by means of creeping roots or rhizomes under Arkansas conditions and has broad, low crowns with extensive branching of the taproot. It has superior persistence under frequent defoliation, good resistance to spotted alfalfa aphid, moderate levels of resistance to common leafspot, downy mildew, and Phytophthora root rot, and measurable levels of resistance to bacterial wilt, summer black stem, potato leafhoppers, and thrips. "Victoria" breaks dormancy a little later in the spring and goes dormant a little earlier in the fall than "Buffalo." It also recovers a little less rapidly after cutting than "Buffalo" under Arkansas conditions. A comparison of the crowns and roots of "Victoria" with those of "Vernal" can be seen in the photo of the enclosed reprint. Supporting data for most of the characteristics are included in the attached mimeographed material. "Victoria" has been registered with the Crop Science Society of America (Registration No. 53).

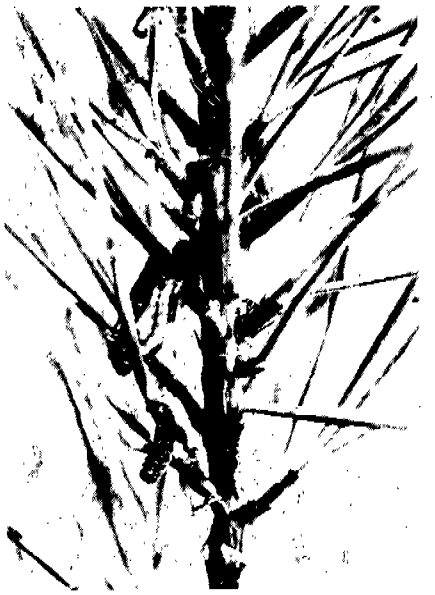
EXHIBIT E

Statement of the Basis of Applicant's Ownership

This is to certify that Dr. E. M. Cralley, as Director, represents the Arkansas Agricultural Experiment Station, who is the employer of M. S. Offutt, the breeder of "Victoria" alfalfa. The Arkansas Agricultural Experiment Station thereby owns the germplasm designated and described as "Victoria" alfalfa, which has been duly registered with the Crop Science Society of America under Registration No. 53.

Betty J. Swope
Notary Public

My Commission Expires: July 31, 1979



These larvae have been killed by the virus. The picture on the cover shows live larvae attacking a tree.

Virus Control of the Arkansas Pine Sawfly

By W. C. YEARIAN and S. Y. YOUNG

THE ARKANSAS pine sawfly or loblolly pine sawfly (*Neodiprion taedae linearis* Ross), is a serious defoliator of Arkansas pines. Although this defoliation seldom results in death of the tree, the impact of reduced growth is considerable.

Several organophosphate insecticides will control the sawfly (as reported in Vol. 14, No. 6 of Arkansas Farm Research). The cost of treatment and possible adverse effects on non-target species, however, have discouraged use of insecticides for sawfly control. Thus, efforts to supplement or replace chemical control with biological contral agents are presently underway.

Arkansas pine sawfly populations reportedly experience periodic epizootics (epidemics) of a virus disease. During a recent epizootic, dead larvae were collected and study confirmed the disease as a nuclear polyhedrosis virus. Laboratory data indicated the virus was highly effective against the sawfly. The virus was propagated in field-collected larvae to supply quantities for field evaluation.

In April, 1969, an Arkansas pine sawfly infestation developed near Harrell in Calhoun County. Low-hanging limbs and small trees infested with second and third instar larvae were located in the area and tagged for treatment. Limbs bearing sawfly larvae were sprayed, to the point of run-off, with the various virus concentrations (polyhedral inclusion bodies (PIB) per ml) shown in the table.

Miller Nu Film BT^{R}, a spreader-sticker, was included in all sprays at 0.25% to insure uniform coverage. Each treatment included at least 10 large sawfly colonies and was replicated 5 times. Sawfly colonies sprayed with water served as checks.

The treated larvae were left undisturbed for 5 days after treatment. The larvae and foliage on which they were feeding were then removed from the tree, placed in paper bags, and taken to the laboratory in Fayetteville. Beginning 7 days after treatment, the larvae were examined daily for virus mortality; examinations continued until all larvae were dead or had constructed a cocoon.

As shown in the table, the highest mean mortality occurred in larvae treated with a virus concentration of $1x10^8$ PIB/ml. Mortality at the $5x10^7$ PIB/ml concentration was considered sufficient for acceptable field control. No appreciable mortality occurred in the check.

It is interesting to note that at the highest mortality rates most of the survivors were males. Male sawfly larvae complete development more rapidly than do females, passing through only 5 developmental stages while females require an additional stage. Apparently some of the males constructed cocoons before the virus infection progressed far enough to kill them. However, even at concentrations as low as $1x10^6$ PIB/ml, enough of the female populations should be killed to reduce the size of subsequent generations of the insect.

Although use of the sawfly virus appears effective in the field, the practicality and economic feasibility of using it in large control programs are still questionable. The virus can be produced only in the host insect, and the sawfly, unlike many insect pests, cannot as yet be mass reared in the laboratory.

In 1970, a study of the feasibility and economics of producing the virus under field conditions was begun. Small trees (less than 20 ft) heavily infested with sawflies were treated with a virus suspension containing $5x10^7$ PIB/ml. After 5 days the diseased colonies were collected, transferred to the laboratory, and held until dead. Dead larvae were picked from the foliage (see photo) and the virus was harvested by macerating the virus-killed larvae in water and filtering through organdy. Approximately $3.6x10^{12}$ PIB were produced, at a labor cost of $262.34. Assuming 2 gallons of spray are needed per acre, enough virus was produced to spray 98 acres at $5x10^7$ PIB/ml at a cost of $2.70 per acre. The costs for other rates are shown in the table.

Although much labor is required for a very short period of time, it appears that the virus can be produced in sufficient quantities at a nominal cost. More virus will be produced in 1971 to get enough stock for large-scale evaluation in 1972.

Dr. Yearian is associate entomologist; Dr. Young is assistant entomologist.

Mortality of Sawfly Larvae 14 Days after Treatment with Virus

Virus conc.	Percent mortality, replications						Estimated
(PIB/ml)	I	II	III	IV	V	Mean	cost/acre[1]
1×10^5	13.1	13.1	7.4	9.5	10.1	10.6	—
5×10^5	62.0	35.3	29.4	35.6	33.7	39.2	—
1×10^6	75.0	57.6	66.8	55.8	84.7	67.9	$0.05
5×10^6	60.4	56.8	70.4	67.8	75.1	66.1	0.27
1×10^7	84.7	66.0	65.4	81.6	60.7	71.7	0.55
5×10^7	78.9	88.6	75.5	91.0	89.9	84.7	2.70
1×10^8	98.4	93.3	75.5	88.5	99.6	91.1	5.50

1 Allowing 2 gallons of spray per acre.

10. GIVE ITEM LENGTH FREQUENCY DISTRIBUTION FOR SUBMITTED AND 1 TO 5 STANDARD VARIETIES 1/

VARIETY NAME	STEM LENGTH FREQUENCY DISTRIBUTION 2/ 0 – 5 mm. %	6 – 10 mm. %	11 – 15 mm. %	16 – 20 mm. %	21 – 30 mm. %	31 – 40 mm. %	41 – 50 mm. %	51 – 60 mm. %	61 – 70 mm. %	71 – 80 mm. %	81 + mm. %	AVERAGE STEM LENGTH

11. FLOWER COLOR 3/ (DETERMINE COLOR ON FRESHLY OPENED FLOWERS)

KE Retest 7-26-76

041 % PURPLE 058 % VARIEGATED ___ % RED YELLOW ___ % CREAM ___ % WHITE

less than 1% cream & white

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

DISEASE	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
BACTERIAL WILT	(SUBMITTED)	14 %			Trial ID: 74-81-01-04 1974 Ames, Iowa
	(RES. CK.) VERNAL	47%			
	(SUS. CK.) NARRAGANSETT	2%			
ANTHRACNOSE	(SUBMITTED)				
	(RES. CK.) ARC				
	(SUS. CK.) SARANAC				
COMMON LEAF SPOT	(SUBMITTED)				
	(RES. CK.) RAMSEY				
	(SUS. CK.) RANGER				
DOWNY MILDEW	(SUBMITTED)				
	(RES. CK.) SARANAC				
	(SUS. CK.) KANZA				
PHYTOPHTHORA ROOT ROT	(SUBMITTED)	20.6%			Trial ID 74-81-01-03 1974 Ames, Iowa
	(RES. CK.) AGATE	54.5%			
	(SUS. CK.) SARANAC	0.7%			
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

1/ Preferred standards: Saranac, Vernal, Norseman, Lahontan, Mesa Sirsa. Twelve hours light at 25° C with 20,000 lux of cool white florescent; 2,000 lux of incandescent filament light and twelve hours darkness at 5° C.

2/ From cotyledonary node to tip of stem 20 days after planting.

3/ For further clarification consult USDA Agricultural Handbook No. 424.

4/ Give: The institution in charge of test, (2) year, and (3) location of test. Describe test procedure if differs from procedure suggested in ARS-NC-19, September 1974.

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

DISEASE	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
	(SUBMITTED)				
OTHER	(RES. CK.)				
	(SUS. CK.)				
	(SUBMITTED)				
OTHER	(RES. CK.)				
	(SUS. CK.)				
INSECT	CULTIVAR	% SEEDLING SURVIVAL	AVG' SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
	(SUBMITTED)				
PEA APHID	(RES. CK.) KANZA				
	(SUS. CK.) RANGER				
	(SUBMITTED)				
SPOTTED ALFALFA APHID	(RES. CK.) KANZA				
	(SUS. CK.) RANGER				
INSECT	CULTIVAR	% DEFOLIATION	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
	(SUBMITTED)				
ALFALFA WEEVIL	(RES. CK.) ARK				
	(SUS. CK.) VERNAL				
INSECT	CULTIVAR	% RESISTANT PLANTS	EMERGED ADULTS PER PLANT	EMERGED LSD .05	TEST, YEAR & LOCATION 4/
	(SUBMITTED)				
ALFALFA SEED CHALCID	(RES. CK.) LAHONTAN				
	(SUS. CK.) SONORA				
INSECT	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
	(SUBMITTED)				
POTATO LEAF-HOPPER	(RES. CK.)				
	(SUS. CK.)				
	(SUBMITTED)				
OTHER	(RES. CK.)				
	(SUS. CK.)				

4/ Give: The institution in charge of test, (2) year, and (3) location of test. Describe test procedure if it differs from procedure suggested in ARS-NC-19, September 1974.

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

INSECT	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				
NEMATODE	**CULTIVAR**	**% RESISTANT PLANTS**	**INDEX (ASI)**	**ASI LSD .05**	**TEST, YEAR & LOCATION 4/**
STEM NEMATODE	(SUBMITTED)				
	(RES. CK.) LAHONTAN				
	(SUS. CK.) RANGER				
NORTHERN ROOT KNOT NEMATODE	(SUBMITTED)				
	(RES. CK.) NEV. SYN. XX				
	(SUS. CK.) LAHONTAN				
SOUTHERN ROOT KNOT NEMATODE	(SUBMITTED)				
	(RES. CK.) MOAPA 69				
	(SUS. CK.) LAHONTAN				
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

13. INDICATE A VARIETY THAT MOST CLOSELY RESEMBLES THE VARIETY SUBMITTED FOR THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHARACTER	VARIETY
AREA OF ADAPTATION	VERNAL	PLANT HEIGHT	VERNAL
RECOVERY AFTER CUTTING	VERNAL	WINTER HARDINESS	VERNAL

REFERENCES

Barnes, D.K., and C.H. Hanson, An Illustrated Summary of Genetic Traits in Tetraploid and Diploid Alfalfa, ARS Technical Bul. 1370.
Barnes, D.K., et al, Standard Tests to Characterize Pest Resistance in Alfalfa Varieties. ARS-NC-19, September 1974.
Nittler, L.W., G.W. McKee, and J.L. Newcomer, Principles and Methods of Testing Alfalfa Seed for Varietal Purity. New York Agricultural Experiment Station Bul. 807.
USDA Agricultural Handbook No. 424.

8

COMMENTS Tests in California show Victoria to have good resistance to the spotted alfalfa aphid. Various trials indicate a moderate level of resistance to common leafspot and downy mildew and measurable resistance to potato leafhopper and thrips. Flower color is quite variable, ranging through shades of white, yellow, green, and purple. Victoria has wide, low crowns and a much-branched taproot system. These characters were measured by relative visual scores at different locations in most cases. Area of adaptation should also include most of the north central area

FORM GR 470-32
(3/75)

FOR[illegible]PPROVED. OMB NO. 40-R3712

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C

OBJECTIVE DESCRIPTION OF VARIETY

Alfalfa (Medicago sativa L. complex)

NAME OF APPLICANT(S)
DIRECTOR, ARKANSAS AGRICULTURAL EXPERIMENT STATION

ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code)
ARKANSAS AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF ARKANSAS
FAYETTEVILLE, ARKANSAS 72701

VARIETY NAME OR TEMPORARY DESIGNATION
VICTORIA

FOR OFFICIAL USE ONLY
PVPO NUMBER
72070

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

NOTE: For single plant data a minimum of 100 plants is suggested

1. PRIMARY AREA OF ADAPTATION

[4] 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST
4 = SOUTHEAST 5 = SOUTHWEST 6 = SOUTHERN PLAINS
7 = INTERMOUNTAIN

INDICATE AREA WHERE TEST WAS CONDUCTED. FURTHER EXPLANATION CAN GO IN COMMENTS AT THE END OF THE FORM.
[4] AREA TESTED

2. WINTER HARDINESS

[7] 1 = NON-HARDY (Mesa Sirsa) 3 = INTERMEDIATE NON-HARDY
5 = MODERATELY HARDY (Saranac) 7 = HARDY (Vernal)
9 = EXTREMELY HARDY (Norseman)

[2] AREA TESTED

[ ] SOURCE OF INFORMATION: 1 = ANTICIPATED 2 = MEASURED

3. FALL GROWTH HABIT

[7] 1 = ERECT (Mesa Sirsa) 3 = SEMIERECT (DuPuits)
5 = INTERMEDIATE (Saranac) 7 = SEMIDECUMENT (Vernal)
9 = DECUMBENT (Norsement)

[4] AREA TESTED

4. RECOVERY AFTER FIRST SPRING CUTTING

[7] 1 = VERY FAST (Mesa Sirsa) 3 = FAST (Saranac) 5 = INTERMEDIATE
7 = SLOW (Vernal) 9 = VERY SLOW (Norseman)

[4] AREA TESTED

5. FLOWERING DATE (FIRST SPRING GROWTH)

[ ][ ] DAYS EARLIER THAN . . . . .
[0][3] DAYS LATER THAN . . . . .

[4] 1 = MESA SIRSA 2 = LAHONTAN
3 = SARANAC 4 = VERNAL
5 = NORSEMAN

[4] AREA TESTED

6. CROWN TYPE

[1] 1 = SPREADING ROOTS 3 = SPREADING RHIZOMES (Teton)
5 = BROAD (Vernal) 7 = INTERMEDIATE (Saranac)
9 = NARROW (Mesa Sirsa)

[4] AREA TESTED

7. PLANT COLOR

[5] 3 = DARK GREEN (Weevlchek) 5 = GREEN (Vernal)
7 = LIGHT GREEN (Ranger)

[4] AREA TESTED

8. HAIRINESS

[ ][ ][ ] % PLANTS WITH PUBESCENT STEMS

[ ][ ][ ] % PLANTS WITH PUBESCENT PODS

9. POD SHAPE

[9][0.][0] % PLANTS WITH TIGHT COILS

[0][7.][0] % PLANTS WITH LOOSE COILS

[0][3.][0] % PLANTS WITH SICKLE PODS (Less than 1 coil)

5

Taproot systems of Victoria (B, left) and Vernal (D, right).

VICTORIA . . . A New Multi-purpose Alfalfa

By M. S. OFFUTT, H. J. WALTERS, and F. D. MINER

A NEW 9-clone, pasture-type synthetic variety of alfalfa (*Medicago sativa* L.) has been developed by the Arkansas Agricultural Experiment Station. It was officially released in 1970 with the name Victoria.

The nine parental clones used in the synthesis of Victoria were selected from about 500 creeping-rooted or rhizomatous clones on the basis of their polycross and S_1 progeny performance for three years at two locations in Arkansas — Fayetteville and Keiser.

Selection was based on forage yield, percent of progeny exhibiting the creeping tendency at the end of the first and second years after establishment, percent leaves in the forage, growth habit, foliage color, spring and fall vigor, rate of recovery after cutting, and resistance to foliar diseases, bacterial wilt, Phytophthora root rot, leafhopper yellowing, and spotted alfalfa aphid.

Victoria is more winter hardy than Buffalo and has a semi-decumbent growth habit, wide, low crowns, and a much-branched taproot system (see photo). From 30 to 50 percent of the plants have the inherent capacity to spread by means of creeping roots or rhizomes in spaced plantings. The creeping habit is seldom expressed in dense stands, however, and does not normally become apparent until there is a noticeable decrease in stand density. Flower color is quite variable, ranging from white through various shades of yellow, green, and purple.

When plants are cut in the early bloom stage for hay, yields of Victoria have been similar to those of Buffalo and Vernal (Table 1). High percentages of leaves and crude protein and a low percentage of crude fiber in forage are desirable from a nutritive standpoint. In these respects, Victoria forage has averaged higher in percent leaves and percent crude protein and lower in percent crude fiber than either Buffalo or Vernal forage (Table 2).

Victoria breaks dormancy somewhat later in the spring and goes dormant somewhat earlier in the fall than do Buffalo and Vernal. It also recovers a little less rapidly after cutting than Buffalo and Vernal. Because Victoria breaks dormancy relatively late in the spring, it is less likely to be frozen back to the crown and plants are less likely to be weakened by late spring freezes than are varieties breaking dormancy earlier.

Victoria has moderate to good resistance to the spotted alfalfa aphid, flower thrips, bacterial wilt, and Phytophthora root rot. It is equal or superior to Buffalo and Vernal in resistance to summer blackstem, common leaf spot, downy mildew, and leafhopper injury.

Some anticipated uses of this new alfalfa variety are:

(1) For pasture or green chop when grown alone or in mixture with an adapted grass because of superior persistence under frequent defoliation.

(2) For production of alfalfa meal because of superior persistence and a high leaf-stem ratio in the forage; and

(3) For hay, especially on shallow or heavy clay soils where standard hay-type varieties normally do not persist well.

Breeder seed will be maintained by the Arkansas Station at Fayetteville, and foundation and certified seed will be produced under contract in the West. Certified seed should be available commercially in the fall of 1972 or the spring of 1973.

Dr. Offutt is agronomist, Dr. Walters is plant pathologist, and Dr. Miner is entomologist.

Table 1. Hay Yields of Victoria, Buffalo, and Vernal in Five Tests at Three Locations

Test	Victoria	Buffalo	Vernal
	Tons acre 12% moisture hay		
Fayetteville			
1965 - 67 av.[1]	4.13	3.94	4.30
1967 - 69 av.[2]	3.70	4.08	4.01
Keiser			
1962 - 65 av.[3]	4.53	4.44	4.57
1967 - 68 av.[4]	2.32	2.06	2.19
Carbondale, Ill.[5]			
1 yr. total	7.24	—	7.05

1 Test No. 11, on a Pembroke silt loam soil.
2 Test No. 12, on a Captina silt loam soil.
3 Test No. 10, on a Sharkey clay-loamy sand, overwash, undulating (mixed) soil.
4 Test No. 13, on a Sharkey clay-loamy sand, overwash, undulating (mixed) soil.
5 On a Weirstoy transition soil with a tight claypan.

Table 2. Percent Leaves, Crude Protein, and Crude Fiber in Hay of Victoria, Buffalo, and Vernal Grown at Two Locations

Test and measure	Victoria	Buffalo	Vernal
Fayetteville, Test No. 11, 1965-67			
% leaves	56.2	53.7	51.7
% crude protein	19.09	17.70	18.96
% crude fiber	26.56	26.52	26.14
Fayetteville, Test No. 12, 1967-69			
% leaves	47.7	45.4	46.9
% crude protein	18.83	18.13	18.31
% crude fiber	28.31	29.81	29.30
Keiser, Test No. 13, 1967-68			
% leaves	55.0	51.9	50.3
% crude protein	20.07	17.74	18.87
% crude fiber	25.78	26.17	26.00